PETITION:

Please correct the filing date for the above application. Please also correct the filing date on the Filing Receipt from Feb. 21, 2002 to Feb. 20, 2002. The Filing Receipt and the Office Action show the filing date as Feb. 21, 2002. However, the correct filing date is Feb. 20, 2002. The papers filed with the application are all dated on Feb. 20, 2002 and indicate filing of the application on that date. Enclosed is a copy of an express mail receipt showing deposit of the application with the U.S. Post Office on Feb. 20, 2002.

Since the U.S. Patent and Trademark Office committed the error, a check for a petition fee is not enclosed. If a petition fee is due, please charge deposit account 19-2179. A duplicate copy of this document is enclosed.

CLAIMS ARE ALLOWABLE:

Independent claim 1 requires determining a lowest value of a display dynamic range and setting a transmit power as a function of a noise level and the lowest value of the display dynamic range. Likewise, independent claim 10 requires a processor operative to set the transmit power level as a function of a noise level and a lowest value of a display dynamic range.

Mucci et al. do not disclose the above limitations. Mucci et al. disclose optimizing the data display of noise and signal information (col. 3, lines 45-60). First, pixel data is classified as either noise or signal based on a regional average amplitude and a number of values above a threshold in a region (col. 2, line 64-col. 3, line 19 and col. 5, lines 37-63). The noise threshold for the amplitude classification may be adjusted based on feed back (col. 6, lines 15-18). Signal values are then enhanced (col. 6, lines 19-30). Noise information is separated from signal information by signal enhancement (col. 8, lines 17-38). Values classified as signal are increased, and values classified as noise are decreased (col. 8, lines 52-59). A gray scale map is then used to map the resulting values within the dynamic range (col. 9, lines 3-9). The gray scale map is either fixed or based on the signal mean and the noise mean (col. 9, lines 24-31 and col. 11, lines 36-44). Running averages of the signal amplitude and noise amplitude are

maintained (col. 7, line 65-col. 8, line 9). Other system settings can be adjusted (col. 9, lines 58-65). Transmit power is "set on the basis of signal power relative to the noise power (S/N) as determined from the estimates of signal and noise mean" (col. 9, line 58-col. 10, line 13). To set the transmit power, Mucci et al. use mean signal values and mean noise values. Mucci et al. do not suggest setting the transmit power as a function of the lowest value of the dynamic range and the noise value.

Independent claim 16 requires determining an excess signal-to-noise ratio with a processor and determining a transmitter power reduction factor as a function of the excess signal-to-noise ratio. Mucci et al. teach performing a contrary operation. Mucci et al. seek to separate the noise information from the signal information, such as by increasing the difference between the noise mean and the signal mean. Mucci et al. increase the signal-to-noise mean ratio by setting the transmit power level as high as possible (col. 9, line 66-col. 10, line 13). As a result, Mucci et al. do not determine an excess signal-to-noise ratio and determine a transmitter power reduction factor as a function of the excess signal-to-noise ratio.

Similarly, independent claim 23 requires determining an excess power with a processor and determining a transmitter power reduction factor as a function of the excess power. As discussed above, Mucci et al. set the transmit power level as high as possible given an application (e.g., adult verses fetal). Mucci et al. do not determine an excess power with a processor and do not determine a transmitter power reduction factor as a function of the excess power.

Independent claim 24 requires iteratively reducing a transmit power and determining a difference between a first signal at a default power level and a second signal at a power level responsive to the iteratively reduced transmit power. Mucci et al. do not suggest these limitations. The Examiner alleges that iterative reduction is inherent, but iterative reduction is not inherent. Mucci et al. describe setting the transmit power as calculated from the mean signal and mean noise. There is no further suggestion to reset the transmit power iteratively.

Mucci et al. teach updating the mean values, but not of iteratively reducing the transmit power. By teaching a non-iterative approach (calculating once based on mean noise and signal values), Mucci et al. demonstrate that iterative reduction of transmit power is not inherent (i.e. required or always resulting).

Mucci et al., even if operating iteratively, do not suggest determining a difference between a first signal at a default power level and a second signal at a power level responsive to the iteratively reduced transmit power.

The dependent claims 2-9, 11-15 and 17-22 depend from the independent claims 1, 10 and 16 discussed above, so are allowable for the same reasons. The dependent claims are further allowable for additional limitations in the dependent claims. For example, Mucci et al. do not disclose: reducing a default transmit power by a factor that is a function of the excess signal-to-noise ratio as claimed in claims 2, 3 and 11; preserving brightness based on setting a gain as a function of transmit power and independent of user settings as claimed in claims 4 and 12 (Mucci et al. set the gain to constrain data to a range suited for the electronics, operator controls and display intensities – col. 10, lines 14-17); calculating a difference between the noise level and the lowest value and reducing the transmit power as a function of the difference as claimed in claims 5 and 13; predicting a noise level for current imaging parameters as a function of an actual noise level as claimed in claim 7; determining a noise level from a table in response to current imaging parameters as claimed in claims 8 and 15 (Mucci et al. teach measuring the noise level); performing the claimed acts independently for different regions of an imaging field as claimed in claim 9; displaying the transmitter power reduction factor as claimed in claim 17; initiating determination of the excess and the power reduction factor in response to user input as claimed in claim 19 (Mucci et al. may perform this automatically once the user sets the system up, so initiating in response to user input is not inherent); recalculating a transmit power level in response to a change in an imaging parameter and initiating determination of excess signal-to-noise ratio in response to recalculating as claimed in claim 20 (Mucci et al. could use the same transmit power and/or may initiate in response to other input, and so do not inherently disclose these limitations); and calculating the excess signal-to-noise

ratio as a function of the difference between a minimum display signal level and a noise level as claimed in claim 21.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 943-7350 or Craig Summerfield at (312) 321-4726.

Respectfully submitted,

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APPENDIX

Page 8, line 25-page 9, line 3:

The noise images may (1) be acquired by imaging without insonification, i.e. with the transmitters turned off (see the discussion in U.S. Patent Nos. 6,120,446 [_______ (Application Serial No. 09/213,666)] or 6,423,003 [__________ (Application Serial No. 09/430,156)]), or (2) be estimated by using the known differences in bandwidth and/or spatial or temporal correlation lengths of the signal and noise (see the discussions in U.S. Patent Nos. ___________ and ________ (Application Serial Nos. 09/430,591 and 09/431,304) or (3) be computed using a system noise model based on a set of currently prevailing imaging parameters (see the discussion in U.S. Patent No. 6,120,446 [___________ (Application Serial No. 09/ 213,666)]). All of these patents are hereby incorporated by reference in their entirety. The methods described above for acquiring noise images may be combined in various ways, and other methods can be used.

a1

10. (amended) An ultrasound system for automatically determining a transmitter power level, the system comprising:

a transmitter responsive to a transmit power level; and

a2 a processor [is] operative to set the transmit power level as a function of a noise level and a lowest value of a display dynamic range.